3.7 WATER RESOURCES

This section discusses the existing water resources in the project area, including surface water, floodplains, wetlands, and groundwater.

3.7.1 Floodplains, Wetlands, and Surface Water

The following discussion of surface water, floodplains, and wetlands applies to all three proposed corridors. Information specific to the Western, Central, and Crossover Corridors is presented separately following the general discussion.

Surface Water. There are numerous small perennial surface waterbodies (present at all seasons of the year) in the proposed project area, some of which would be spanned by the proposed transmission line. The largest intermittent surface water feature, the Santa Cruz River, would not be crossed by any of the three proposed corridors. The Santa Cruz River, as shown in Figure 3.7–1, flows northward from Mexico into the project area. Historical data from the U.S. Geological Survey over 76 years (water years 1913-22, 1930-95) indicate that the average discharge near Nogales is 28.3 cubic feet per second (ft^3/s) (0.801 cubic meters per second [m^3/s]), or 20,500 acre-feet per year (acre-ft/yr). The median of yearly mean discharges is 20 ft^3/s (0.57 m^3/s), or 14,500 acre-ft/yr (USGS 2001).

Northern Portion. All three proposed corridors would cross one drainage in the vicinity of land managed by the Bureau of Land Management (BLM). There are no major washes on the BLM land.

Tumacacori Ecosystem Management Area. In the Tumacacori Ecosystem Management Area (EMA) of the Coronado National Forest, there are many ephemeral and three perennial streams and washes. One of the perennial streams is Sycamore Creek. A 1,759-acre (712-ha) section of Sycamore Creek and its surrounding environment were nominated in 1993 as a Wild and Scenic River under the *National Wild and Scenic Rivers System Act* of 1968 (USFS 2001b), although never designated as such. As shown in Figure 3.7–2, the proposed project (Western Corridor) crosses the Sycamore Canyon watershed, but is north of the nominated section, which is south of Ruby Road to the U.S.-Mexico border (see Figure 3.12–1). Arivaca Lake and Peña Blanca Lake, also shown in Figure 3.7–2, are man-made lakes within the Coronado National Forest, although not crossed by any of the three proposed corridors. Surface water uses within the Coronado National Forest include wildlife, livestock, recreation, mining, and domestic use.

The U.S. Department of Agriculture Forest Service (USFS) has classified the Tumacacori EMA according to a number of parameters evaluating the area's watersheds and surface water. Water quality is based on analysis of parameters such as fecal coliform, bacteria, dissolved oxygen, pH, salinity, and temperature at points downstream from the Coronado National Forest. Watershed condition and function is based on soil condition, soil productivity, riparian condition, water quality, and how water cycles through the ecosystem. Satisfactory watershed condition and function denote a watershed functioning at a sustainable desired level with no long-term changes predicted and a very low risk of management-induced deterioration. Unsatisfactory watershed condition and function would require capital investment to bring the watershed to the desired condition (USFS 2001b).

Nogales U.S.-Mexico Border Area. The proposed crossing of the U.S.-Mexico border would be the same for all three corridors. TEP's proposed project design is for the transmission line to cross the U.S.-Mexico border using monopole structures located at least 400 ft (120 m) away from the U.S.-Mexico border (TEP 2003). The United States Section of International Boundary Water Commission, U.S.-Mexico (USIBWC) will not approve any construction in the United States that increases, concentrates, or relocates overland drainage flows into either the United States or Mexico. Surface drainage must be handled so that there is

no increase of volume, peak runoffs, or flow concentration across the border in either direction (USIBWC 2003). Prior to construction of the selected corridor, Tucson Electric Power Company (TEP) would provide site-specific drawings to USIBWC for approval along with any hydrological or hydraulic studies for work proposed in the vicinity of the U.S.-Mexico border. This would include review of any structures proposed to be constructed in any drainage courses that cross the border. No structures are currently proposed to be constructed in drainage courses that cross the border.

Floodplains and Wetlands. Under Executive Order 11988, *Floodplain Managemen*t, and Executive Order 11990, *Protection of Wetland*s, Federal agencies are required to consider the impact of proposed actions on wetlands and floodplains. The Executive Orders are intended to be used by Federal agencies to implement floodplain and wetland requirements through existing procedures, such as those established to implement the *National Environmental Policy Act* of 1969 (NEPA). The U.S. Department of Energy (DOE) requirements for compliance with Executive Orders 11988 and 11990 are found in Title 10, *Code of Federal Regulations* (CFR), Part 1022, "Compliance with Floodplain/Wetlands Environmental Review Requirements." A Floodplain and Wetland Assessment, in compliance with Title 10 CFR 1022, has been prepared and is included in Appendix C of this Draft Environmental Impact Statement (EIS). A floodplain/wetlands assessment consists of a description of the proposed action, a discussion of its effects on the floodplain and wetlands, and consideration of the alternatives.

If DOE determines that there is no alternative to implementing a proposed project in a floodplain, a brief statement of findings must be prepared. This statement of findings would include a description of the proposed action, an explanation indicating why the project must be located in a floodplain, a list of alternatives considered, measures that will be taken to comply with state and local floodplain protection standards, and a description of the steps to be taken to minimize adverse impacts to the floodplain.

Floodplains are delineated (that is, mapped and classified) by the Federal Emergency Management Agency (FEMA). When maintained in a natural state, floodplains provide valuable services by moderating the extent of flooding, thereby (1) reducing the risk of downstream flood loss; (2) minimizing the impacts of floods on human safety, health, and welfare; and (3) providing support to wetlands, fish, and wildlife. For the purposes of this assessment, the extent of the 100-year floodplain along the Santa Cruz River and its tributaries was determined from FEMA Flood Insurance Rate Maps, county soil survey maps, and consultation with USFS (USFS 2003). The expansion of the South Substation, regardless of the corridor selected, would occur within the 100-year floodplain, as shown in Figure 3.7–3. Each of the three proposed corridors would also cross portions of the 100-year floodplain. The FEMA maps indicate that the following tributaries could be part of the 100-year floodplain: Sopori, Toros, Diablo, Las Chivas, and Mariposa Canyon Wash (see Figure 3.7–3, and Figures 2 through 5 in Appendix C). Additional unmapped floodplains may also occur in the project area. In those areas where the regulatory floodplains have not been delineated, the county engineer may require the project proponent to establish the regulatory floodplain and floodway limits through a hydrologic and hydraulic study prepared by an Arizona registered professional civil engineer.

Wetlands are a subset of waters of the United States. Waters of the United States are defined in the *Clean Water Act* (CWA) as "surface waters, including streams, streambeds, rivers, lakes, reservoirs, arroyos, washes, and other ephemeral watercourses and wetlands." Waters of the United States on the project area are under the jurisdiction of the U.S. Army Corps of Engineers (USACE), and activities that result in impacts to waters of the United States (including wetlands) must be permitted by USACE under Section 404 of the CWA. TEP is currently in consultation with USACE on a preliminary jurisdictional delineation for the South Substation. Upon final selection of an alternative, TEP would apply to USACE for either a nationwide permit or individual permit for the proposed corridor. TEP would site the transmission line structures and new access roads, to the extent feasible, such that they would span across (rather than be located within) any jurisdictional waters.

Wetlands are defined as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (40 CFR 230.3[t]). Wetlands serve a variety of functions within the ecosystem, including water quality preservation, flood protection, erosion control, biological productivity, fish and wildlife habitat, cultural values, aesthetic values, economic values, and scientific values.

No wetlands (either within or outside of the USACE jurisdiction) were found in the proposed project corridors during field surveys conducted by Harris Environmental Group for the Biological Assessments (HEG 2003a, b, and c) and none were identified by USFS (USFS 2003). There may be small areas of potential wetlands within the proposed corridors that are associated with manmade stock ponds and impoundments; TEP would site the transmission line to avoid such areas.

3.7.1.1 *Western Corridor*

The Western Corridor would cross numerous very small dry washes and approximately 15 large washes (TEP 2001). Outside of the Coronado National Forest, the larger washes crossed, starting from west of Sahuarita and going south, include Demetries, Esperanza, Escondido, Proctor, Batamote, Sopori, and Saucito Wash as shown in Figure 3.7–1. Within the Coronado National Forest, the Western Corridor passes through the watersheds of the perennial surface waters of Sycamore, East Fork Apache, and Peck Canyons, shown in Figure 3.7–2, along with numerous smaller tributaries to these waterbodies. The following drainages are crossed by the Western Corridor in the Coronado National Forest: Alamo Canyon Creek, Pesqueria Canyon Creek, Calabasas Canyon Creek, Walker Canyon Creek, Peña Blanca Canyon Creek, Apache Canyon Creek, Murphy Canyon Creek, Lobo Canyon Creek, Sardina Canyon Creek, Sycamore Canyon Creek, and Cedar Canyon Creek. The Western Corridor approaches within 2 mi (3 km) of a total of 10 mapped springs (URS 2003a).

The USFS has classified (as described in Section 3.7.1) watershed and surface water parameters (watershed condition and function) within the Tumacacori EMA. The water quality is Satisfactory for Sycamore Canyon and the portion of the Western Corridor south of Ruby Road, and Unsatisfactory for the remaining portion of the Western Corridor north of Ruby Road. The areas with Unsatisfactory water quality also generally have Unsatisfactory watershed condition and function. Likewise, those areas with Satisfactory water quality also have Satisfactory watershed condition and function.

3.7.1.2 *Central Corridor*

The Central Corridor would cross numerous very small dry washes and approximately 14 large washes. Outside of the Coronado National Forest, the larger washes crossed, starting from west of Sahuarita and going south, include Demetries, Esperanza, Escondido, Sopori, Toros, Diablo, and Las Chivas Washes, and Tubac Creek, Aliso Canyon, and Rock Corral Canyon, as shown in Figure 3.7–1. Within the Coronado National Forest, the Central Corridor passes through the watershed of the perennial surface waters of Peck Canyon, shown in Figure 3.7–2, along with numerous smaller tributaries. The following drainages are crossed by the Central Corridor in the Coronado National Forest: Potrero Canyon Creek, Alamo Canyon Creek, Pesqueria Canyon Creek, Bellotosa Canyon Creek, Calabasas Canyon Creek, Caralampi Canyon Creek, Agua Fria Canyon Creek, Peck Canyon Creek, Negro Canyon Creek, Tinaja Canyon Creek, Rock Corral Canyon Creek, Aliso Canyon Creek, Luback Creek, and Puerto Canyon Creek. The Central Corridor does not approach within 2 mi (3 km) of any mapped springs (URS 2003a).

USFS has classified the Tumacacori EMA according to a number of parameters evaluating the area's watersheds and surface water parameters (watershed condition and function). The water quality and watershed function is Unsatisfactory for the northern portion of the Central Corridor within the

Tumacacori EMA, and is Satisfactory from just north of crossing Ruby Road to exiting the Forest near Nogales. The watershed condition is Unsatisfactory for almost the entire length of the Central Corridor within the Tumacacori EMA.

3.7.1.3 *Crossover Corridor*

The Crossover Corridor would cross numerous very small dry washes and approximately 15 large washes. Outside of the Coronado National Forest, the larger washes crossed, starting from west of Sahuarita and going south, include Demetries, Esperanza, Escondido, Proctor, Batamote, Sopori, and Saucito Wash, as shown in Figure 3.7–1. Within the Coronado National Forest, the Crossover Corridor passes through the watersheds of the perennial surface water of East Fork Apache Canyon and Peck Canyon, shown in Figure 3.7–2, along with numerous smaller tributaries. Agua Fria (Peña Blanca) Canyon is another perennial surface waterbody crossed by the Crossover Corridor in the Tumacacori EMA. The following drainages are crossed by the Crossover Corridor in the Coronado National Forest: Alamo Canyon Creek, Pesqueria Canyon Creek, Bellotosa Canyon Creek, Calabasas Canyon Creek, Caralampi Canyon Creek, Agua Fria Canyon Creek, Peck Canyon Creek, Lost Dog Canyon Creek, Pine Canyon Creek, Apache Canyon Creek, Murphy Canyon Creek, Lobo Canyon Creek, Cedar Canyon Creek, Sardina Canyon Creek, and Potrero Canyon Creek. The Crossover Corridor approaches within 2 mi (3 km) of 4 mapped springs (URS 2003a).

USFS has classified the Tumacacori EMA according to a number of parameters evaluating the area's watersheds and surface water parameters (watershed condition and function). The water quality and watershed function is classified as Unsatisfactory for the northern portion of the Crossover Corridor within the Tumacacori EMA, and is classified as Satisfactory from just north of crossing Ruby Road to exiting the Coronado National Forest near Nogales. The watershed condition has been classified as Satisfactory for the portion of the Crossover Corridor traversing Peck Canyon, and Unsatisfactory for remaining portions of the Crossover Corridor within the Tumacacori EMA.

3.7.2 Groundwater

3.7.2.1 *Western Corridor*

The project area is located within two Active Management Areas (AMAs) for groundwater as identified by the State of Arizona, Department of Water Resources. The Santa Cruz AMA is located in the southern portion of the project area, while the Tucson AMA covers the northern part. These areas (and three others) were established to aid in the proper management of groundwater resources in Arizona.

In the Santa Cruz AMA, basin-fill sediments along the Santa Cruz River between Nogales and Amado form three aquifer units in the area. In ascending order, they are the Nogales Formation, the Older Alluvium, and the Younger Alluvium. Both of the latter alluvial units are generally unconfined and hydraulically connected, although the Older Alluvium does exhibit semi-confined and confined conditions in some places. The Nogales Formation is not a good aquifer (that is, does not produce useable quantities of water) and is best considered as "hydrologic bedrock" (ADWR 1999a).

The aquifer closest to the surface, the Younger Alluvium, is comprised of coarse-grained stream channel and floodplain deposits, and is typically found at depths from 40 to 150 ft (12 to 46 m). Hydraulic conductivities are quite large and some wells yield over 1,000 gallons per minute (3,785 liters per minute). The amount of groundwater in storage in the Younger Alluvium is estimated at 159,500 acre-ft (ADWR 1999a).

The Tucson AMA consists of two hydrogeologic subbasins the Avra Valley Subbasin and the northern part of the Upper Santa Cruz Valley Subbasin. The uppermost aquifers in these subbasins are the Upper Alluvial Unit and the Recent Alluvial Deposits, respectively. The former is composed of silt and gravel, while the Recent Alluvial Deposits are predominately unconsolidated sand and gravel (ADWR 1999b).

Depth to groundwater in the Tucson AMA varies greatly, from less than 100 ft (30 m) to over 600 ft (183 m). In general, depths to water tend to be shallower near rivers and major washes and deeper near mountain fronts where land surface elevations are higher (ADWR 1999b).

Groundwater levels have declined substantially in the Tucson AMA in the last 50 years as a result of groundwater pumping for municipal, agricultural, and industrial uses. In some areas outside of the project area, significant land subsidence has occurred.

The amount of groundwater in storage to a depth of 1,000 ft (3,785 m) in the Tucson AMA is estimated at 12.7 million acre-ft (ADWR 1999b).

The U.S. Environmental Protection Agency (EPA) designated the aquifers in the Tucson and Santa Cruz AMAs as Sole Source Aquifers. Under this program, the aquifers present in this area are collectively referred to as the Upper Santa Cruz and Avra Basin Aquifer. The Sole Source Aquifer program was created under the *Safe Drinking Water Act* of 1974 to protect drinking water supplies in areas with few or no alternative sources to the groundwater resource.

A small number of private wells are scattered throughout the proposed project area.

3.7.2.2 *Central Corridor*

The groundwater resources described above for the Western Corridor also apply to the Central Corridor.

3.7.2.3 *Crossover Corridor*

The groundwater resources described above for the Western Corridor also apply to the Crossover Corridor.